

MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2321
Gaithersburg, Maryland 20899

SRM Number: 1649a
MSDS Number: 1649a
SRM Name: Urban Dust
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SECTION I. MATERIAL IDENTIFICATION

Material Name: Urban Dust

Description: Standard Reference Material (SRM) 1649a is an atmospheric particulate material collected in an urban area (1976 to 1977) and is intended for use in evaluating analytical methods for the determination of selected polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, chlorinated pesticides, and total carbon in atmospheric particulate material and similar matrices. Reference and information values are also provided for selected polychlorinated dibenzo-*p*-dioxin and dibenzofuran congeners, inorganic constituents, total extractable material, mutagenic activity, particle-size characteristics, and chemical and isotopic (¹⁴C) carbon composition. All of the constituents for which certified, reference, and information values are provided in SRM 1649a are naturally present in the particulate material. SRM 1649a is the same particulate material that was issued previously in 1982 as SRM 1649; this material has been rebottled and reanalyzed to provide updated certified values as well as certified, reference, and information values for additional constituents. A unit of SRM 1649a consists of a bottle containing 2.5 g of particulate material.

Other Designations: Lead (plumbum), Iron and Sulfur in Dust

Name	Chemical Formula	CAS Registry Number
Lead	Pb	7439-92-1
Iron	Fe	7439-89-6
Sulfur	S	7704-34-9

Other Designations (continued): Reference individual compounds

Name	Chemical Formula	CAS Registry Number ⁽¹⁾
PAHs, PCBs, Chlorinated Pesticides, Total Carbon, polychlorinated dibenzo- <i>p</i> -dioxin and dibenzofuran congeners, inorganic constituents, total extractable material, mutagenic activity, particle-size characteristics, and chemical and isotopic (¹⁴ C) carbon composition.	complex mixture	see individual compounds

DOT Classification: Not regulated by DOT

Manufacturer/Supplier: Not Applicable

⁽¹⁾ For the CAS Registry Numbers of the PAHs, PCBs, chlorinated pesticides, polychlorinated dibenzo-*p*-dioxin and dibenzofuran congeners, inorganic constituents, and chemical and isotopic (¹⁴C) carbon composition for this material, refer to the corresponding compound.

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration	Exposure Limits and Toxicity Data ⁽²⁾
Lead Dust	1.24 %	OSHA TLV-TWA: 50 µg/m ³ (as Pb)
		OSHA TWA Action Level (8 h): 30 µg/m ³ (as Pb)
		ACGIH TLV-TWA: 0.05 mg/m ³ (as Pb)
		Woman, Oral: TD _{LO} : 450 mg/kg/6 years

⁽²⁾ Exposure limits and toxicity data are given for lead which is classified as a potential carcinogen. The suggested ACGIH TLV-TWA for particulates not otherwise regulated is 10 mg/m³ for total dust.

Hazardous Components	Nominal Concentration	Exposure Limits and Toxicity Data ⁽³⁾
Iron Dust	2.98 %	OSHA TWA: 10 mg/m ³ (as Fe)
		ACGIH TWA: 5 mg/m ³ (as Fe)
		LD ₅₀ : 30 gm /kg, oral-rat
		TD _{LO} : 77 mg/kg, oral-child

⁽³⁾ Carcinogenic status has not been evaluated by IARC.

Hazardous Components	Nominal Concentration	Exposure Limits and Toxicity Data ⁽⁴⁾
Sulfur Dust	3.27 %	LD: 8437 mg/kg, oral-rat
		LC ₅₀ : 1660 mg/m ³ , inhalation-mammal
		LD _{LO} : 8 mg/kg, intravenous-rat
		LD _{LO} : 10 mg/kg, intravenous-dog

⁽⁴⁾ Non-carcinogenic

NOTE -The matrix of this material is an atmospheric particulate substance collected in an urban area. This material contains organic materials (PAHs, PCB congeners, and chlorinated pesticides), many which have been reported to have toxic, mutagenic, and/or carcinogenic properties, and should be handled with care. The carcinogens in this material have a total concentration < 0.1 % and **DO NOT** require individual MSDS information under current regulations.

The following Table A lists the organic materials and inorganic elements present in the material.

For the actual concentrations, see the corresponding Certificate of Analysis.

SECTION II. HAZARDOUS INGREDIENTS (CONTINUED) – TABLE A

Hazardous Components			Nominal Concentration	Exposure Limits/ Toxicity Data
Certified Selected PAHs Phenanthrene Anthracene Fluoranthene Pyrene Benz[<i>a</i>]anthracene Chrysene Triphenylene Benzo[<i>b</i>]fluoranthene Benzo[<i>k</i>]fluoranthene Benzo[<i>a</i>]fluoranthene Benzo[<i>e</i>]pyrene Benzo[<i>a</i>]pyrene Perylene Anthanthrene Benzo[<i>ghi</i>]perylene Indeno[1,2,3- <i>cd</i>]pyrene Dibenz[<i>a,j</i>]anthracene Dibenz[<i>a,c</i>]anthracene Dibenz[<i>a,h</i>]anthracene Pentaphene Benzo[<i>b</i>]chrysene Picene Reference Selected PAHs Fluorene Dibenzothiophene 1-Methylphenanthrene 2-Methylphenanthrene 3-Methylphenanthrene 4-Methylphenanthrene and 9-Methylphenanthrene 4H-Cyclopenta[<i>def</i>]phenanthrene Benzo[<i>c</i>]phenanthrene Benzo[<i>ghi</i>]fluoranthene Benzo[<i>j</i>]fluoranthene Indeno[1,2,3- <i>cd</i>]fluoranthene Benzo[<i>c</i>]chrysene	Certified Selected PCB Congeners PCB 8 (2,4'-Dichlorobiphenyl) PCB 18 (2,2',5'-Trichlorobiphenyl) PCB28 (2,4,4'-Trichlorobiphenyl) PCB 31 (2,4',5'-Trichlorobiphenyl) PCB 44 (2,2',3',5'-Tetrachlorobiphenyl) PCB 49 (2,2',4',5'-Tetrachlorobiphenyl) PCB 52 (2,2',5',5'-Tetrachlorobiphenyl) PCB 66 (2,3',4,4'-Tetrachlorobiphenyl) PCB 87 (2,2',3,4,5'-Pentachlorobiphenyl) PCB 95 (2,2',3,5',6-Pentachlorobiphenyl) PCB 99 (2,2',4,4',5-Pentachlorobiphenyl) PCB 101 (2,2',4,5,5'-Pentachlorobiphenyl) PCB 105 (2,3,3',4,4'-Pentachlorobiphenyl) PCB 110 (2,3,3',4',6-Pentachlorobiphenyl) PCB 118 (2,3',4,4',5-Pentachlorobiphenyl) PCB 128 (2,2',3,3',4,4'-Hexachlorobiphenyl) PCB 138 (2,2',3,4,4',5'-Hexachlorobiphenyl) PCB 149 (2,2',3,4',5',6-Hexachlorobiphenyl) PCB 153 (2,2',4,4',5,5'-Hexachlorobiphenyl) PCB 156 (2,3,3',4,4',5-Hexachlorobiphenyl) PCB 170 (2,2',3,3',4,4',5-Heptachlorobiphenyl) PCB 180 (2,2',3,4,4',5,5'-Heptachlorobiphenyl) PCB 183 (2,2',3,4,4',5',6-Heptachlorobiphenyl) PCB 187 (2,2',3,4',5,5',6-Heptachlorobiphenyl) PCB 194 (2,2',3,3',4,4',5,5'-Octachlorobiphenyl) PCB 195 (2,2',3,3',4,4',5,6-Octachlorobiphenyl) PCB 201 (2,2',3,3',4,5',6,6'-Octachlorobiphenyl) PCB 206 (2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl) PCB 209 Decachlorobiphenyl Reference Selected PCB Congeners PCB 45 (2,2',3,6-Tetrachlorobiphenyl) PCB 56 (2,3,3',4-Tetrachlorobiphenyl) PCB 63 (2,3,4',5-Tetrachlorobiphenyl) PCB 70 (2,3',4',5-Tetrachlorobiphenyl) PCB 74 (2,4,4',5-Tetrachlorobiphenyl) PCB 77 (3,3',4,4'-Tetrachlorobiphenyl) PCB 107 (2,3,3',4,5'-Pentachlorobiphenyl) PCB 132 (2,2',3,3',4,6'-Hexachlorobiphenyl) PCB 146 (2,2',3,4',5,5'-Hexachlorobiphenyl)	Reference Selected PCB Congeners PCB 158 (2,3,3',4,4',6-Hexachlorobiphenyl) PCB 163 (2,3,3',4',5,6-Hexachlorobiphenyl) PCB 174 (2,2',3,3',4,5,6'-Heptachlorobiphenyl) PCB 193 (2,3,3',4',5,5',6-Heptachlorobiphenyl) Certified Chlorinated Pesticides Hexachlorobenzene <i>trans</i> -Chlordane (γ-Chlordane) <i>cis</i> -Chlordane (α-Chlordane) <i>trans</i> -Nonachlor 2,4'-DDE 4,4'-DDE 4,4'-DDD 4,4'-DDT Reference Concentrations for Selected PAHs Dibenzo[<i>a,e</i>]pyrene Dibenzo[<i>a,h</i>]pyrene Dibenzo[<i>a,i</i>]pyrene Dibenzo[<i>b,k</i>]fluoranthene Naphtho[2,3- <i>a</i>]pyrene Naphtho[2,3- <i>e</i>]pyrene Naphtho[2,3- <i>b</i>]fluoranthene Naphtho1,2- <i>k</i>]fluoranthene Naphtho[2,3- <i>k</i>]fluoranthene Reference Concentrations for Selected Chlorinated Pesticides Heptachlor	N/A ⁽⁵⁾ (All)	N/A ⁽⁵⁾ (All)

⁽⁵⁾ PAHs, PCB congeners, and chlorinated pesticides have been reported to have toxic, mutagenic, and/or carcinogenic properties, and therefore, should be handled with care. The carcinogens in this material have a total concentration < 0.1 % and **DO NOT** require individual MSDS information under current regulations.

SECTION II. HAZARDOUS INGREDIENTS – TABLE A (CONTINUED)

Hazardous Components			Nominal Concentration	Exposure Limits and Toxicity Data
Reference Concentrations for Selected Dibenzo-<i>p</i>-dioxin and Dibenzofuran Congeners 2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin 1,2,3,7,8-Pentachlorodibenzo- <i>p</i> -dioxin 1,2,3,4,7,8-Hexachlorodibenzo- <i>p</i> -dioxin 1,2,3,6,7,8-Hexachlorodibenzo- <i>p</i> -dioxin 1,2,3,7,8,9-Hexachlorodibenzo- <i>p</i> -dioxin 1,2,3,4,6,7,8-Heptachlorodibenzo- <i>p</i> -dioxin Octachlorodibenzo- <i>p</i> -dioxin 2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin 1,2,3,7,8-Pentachlorodibenzo- <i>p</i> -dioxin 1,2,3,4,7,8-Hexachlorodibenzo- <i>p</i> -dioxin 1,2,3,6,7,8-Hexachlorodibenzo- <i>p</i> -dioxin 1,2,3,7,8,9-Hexachlorodibenzo- <i>p</i> -dioxin 1,2,3,4,6,7,8-Heptachlorodibenzo- <i>p</i> -dioxin Octachlorodibenzo- <i>p</i> -dioxin Tetrachlorodibenzo- <i>p</i> -dioxins Pentachlorodibenzo- <i>p</i> -dioxins Hexachlorodibenzo- <i>p</i> -dioxins Heptachlorodibenzo- <i>p</i> -dioxins Tetrachlorodibenzofurans Pentachlorodibenzofurans Hexachlorodibenzofurans Heptachlorodibenzofurans Dibenzo- <i>p</i> -dioxins Dibenzofurans	Reference Concentrations for Selected Elements Bromine Chlorine Magnesium Zinc	Reference Concentrations for Selected Elements Antimony Arsenic Barium Cadmium Cerium Cesium Chromium Cobalt Copper Europium Hafnium Lanthanum Manganese Molybdenum Nickel Rubidium Samarium Scandium Selenium Silver Thorium Tin Tungsten Uranium Vanadium	N/A ⁽⁵⁾ (All)	N/A ⁽⁵⁾ (All)

⁽⁵⁾ PAHs, PCB congeners, and chlorinated pesticides have been reported to have toxic, mutagenic, and/or carcinogenic properties, and therefore, should be handled with care. The carcinogens in this material have a total concentration < 0.1 % and **DO NOT** require individual MSDS information under current regulations.

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

LEAD
Appearance and Odor: White to gray/brown powder
Relative Atomic Mass: 207.20
Density: 11.3 g/cm ³
Decomposition Point: 1740 °C
Melting Point: 328 °C
Solubility in Water: Insoluble
Solubility in Other Compounds: Soluble in nitric acid and hot sulfuric acid

IRON
Appearance and Odor: White to gray/brown powder
Relative Atomic Mass: 55.85
Density: 7.6 g/cm ³
Boiling Point: 2750 °C
Melting Point: 1535 °C
Solubility in Water: Insoluble
Solubility in Other Compounds: Soluble in acids.

SULFUR
Appearance and Odor: White to gray/brown powder
Relative Atomic Mass: 32.1
Density: 2.1 g/cm ³
Boiling Point: 445 °C
Melting Point: 113 °C
Solubility in Water: Insoluble
Solubility in Other Compounds: Soluble in carbon disulfide, carbon tetrachloride, benzene, liquid ammonia.

Organics (PAHs, PCB congeners, and Chlorinated Pesticides)

Appearance and Odor: Many organics have a strong but not unpleasant odor.

Molecular Weight: Variable; reference individual compound.

Water Solubility: Most organics are insoluble in water.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable **Method Used:** Not Applicable **Autoignition Temperature:** Not Applicable

Flammability Limits in Air (Volume %): **UPPER:** Not Applicable
LOWER: Not Applicable

Unusual Fire and Explosion Hazards: Negligible. The major hazards of organic materials involved in fires are associated with the possibility of the contaminants being released into the environment, where they and their products of degeneration can pose serious long-term health risks.

Extinguishing Media: Use dry chemical, carbon dioxide, water, or regular foam.

Special Fire Procedures: Move container from fire hazard if possible. Avoid breathing vapors or dust. Fire fighters should wear a self-contained breathing apparatus with full face shield and operated in pressure-demand or other positive pressure mode.

SECTION V. REACTIVITY DATA

Stability: X Stable Unstable

Conditions to Avoid: Avoid contact with heat, sparks, flames, or other sources of ignition. Avoid inhalation of vapors or combustion by-products. Avoid contact with the skin. **DO NOT** allow the material to contaminate water sources.

Incompatibility (Materials to Avoid): Organics are incompatible with oxidizing agents.

See Section IV: *Unusual Fire and Explosion Hazards*

Hazardous Decomposition or Byproducts: Thermal decomposition products of organics may include toxic oxides of carbon.

Hazardous Polymerization: Will Occur X Will Not Occur

SECTION VI. HEALTH HAZARD DATA

Route of Entry: X Inhalation X Skin X Ingestion

Health Hazards (Acute and Chronic): This material may be harmful by inhalation or ingestion and is irritating to the mucous membranes and upper respiratory tract. Absorption of large amounts of lead or lead compounds may cause a metallic taste, thirst, a burning sensation in the mouth and throat, salivation, abdominal pain with severe colic, vomiting, diarrhea, fatigue, or sleep disturbances. Other signs and symptoms of exposure include metal fume fever (an influenza-like illness), disorientation, tingling sensation, convulsions, or paralysis. Prolonged or repeated exposure to low levels of lead may result in an accumulation in body tissues and exert adverse effects on the blood, nervous system, heart, endocrine and immune systems, kidneys, and reproductive system. Lead may have reproductive effects or cause birth defects. It is also suspected as a potential carcinogen in animals.

Organics: Many of the organics in this material are known or suspected carcinogens with mutagenic properties. Exposure to organic materials can cause cough, confusion, ataxia, headache, weakness, and dizziness. Ingestion may cause abdominal pain, nausea, vomiting, and diarrhea. Most organics are liver toxins.

Medical Conditions Generally Aggravated by Exposure Blood disorders, nervous system disorders, gastrointestinal disorders, and respiratory disorders.

Listed as a Carcinogen/Potential Carcinogen (PAHs, PCB Congeners, and Chlorinated Pesticides): ⁽⁶⁾

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	<u> X </u>	<u> </u>
In the International Agency for Research on Cancer (IARC) Monographs	<u> X </u>	<u> </u>
By the Occupational Safety and Health Administration (OSHA)	<u> X </u>	<u> </u>

⁽⁶⁾ Many PAHs, PCB Congeners, and chlorinated pesticides are classified as carcinogens or potential carcinogens. Reference individual compounds for carcinogenic status. The carcinogens in this material have a total concentration < 0.1 % and **DO NOT** require individual MSDS information under current regulations.

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration by qualified personnel. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. **DO NOT** induce vomiting. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: Liver, blood disorders, nervous system disorders, gastrointestinal disorders, and respiratory disorders.

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of spills. Evacuate nonessential personnel. Dust particles can be gathered and placed into containers for later disposal. Residue should be cleaned up using a high-efficiency particulate filter vacuum.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and chemically resistant gloves to prevent contact with this material.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

This material should be stored in a cool, dry, well-ventilated area away from incompatible materials and conditions. Protect containers from physical damage.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information System, MSDS *Lead, Iron, Sulfur*, March 19, 2003

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.